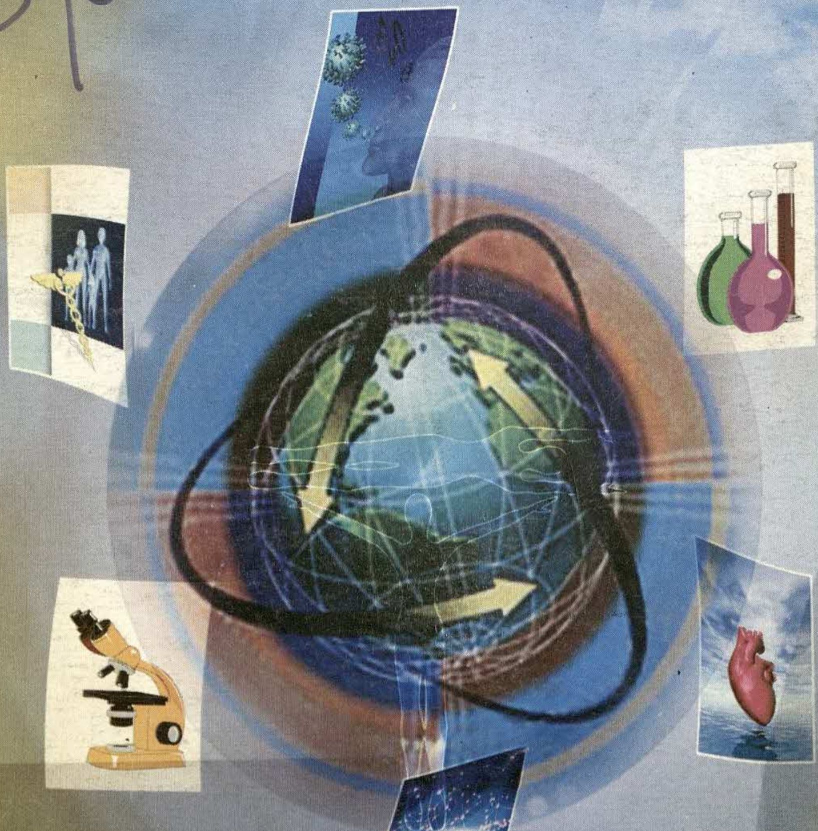
79

VIGYAN SIKSHAK

The Science Teacher

333 / Gift



Volume : 49 ★ No. : 1, 2 & 3 ★ Jan., Feb. & March 2005

39th Annual Conference : Special Issue

All India Science Teachers' Association

Scientific awareness for all !
39th Annual Conference
ALL INDIA SCIENCE TEACHERS' ASSOCIATION (AISTA)
26,27 & 28 DECEMBER, 2004-PATNA

Inaugural Session : A view of the dias from Left to right - Smt. M. Prakash, Shri Vijay Prakash, Shri Basudeo Singh, Prof. Rajmani Pd. Sinha, Dr. S. N. Giri, Prof. R. P. Singh, Prof. J. N. Chatterjea, Dr. Vijay Krishna.

areness for all !
Science for the common masses !!
39th Annual Conference
DIA SCIENCE TEACHERS' ASSOCIATION (AISTA)
26,27 & 28 DECEMBER,2004-PATNA

Dr. S. N. Giri, Prof. J. N. Chatterjea, Dr. Vijay Krishna, Dr. M. M. Chel, Prof. Vinay Kr. Kantha, Prof. Saroj Bala Sinha

Girls of BNR Training College & Sangeet Mandir, Patna performing welcome dance.

Girls of BNR Training College & Sangeet Mandir, Patna Performing welcome dance.

Eminent chemist Prof. J. N. Chatterjea inaugurating the AISTA conference, on his left Prof. Jayshree Bhattacharya & Right Prof. S. B. Sinha

Welcome address by
Prof. (Smt.) Saroj Bala Sinha

333/Gift

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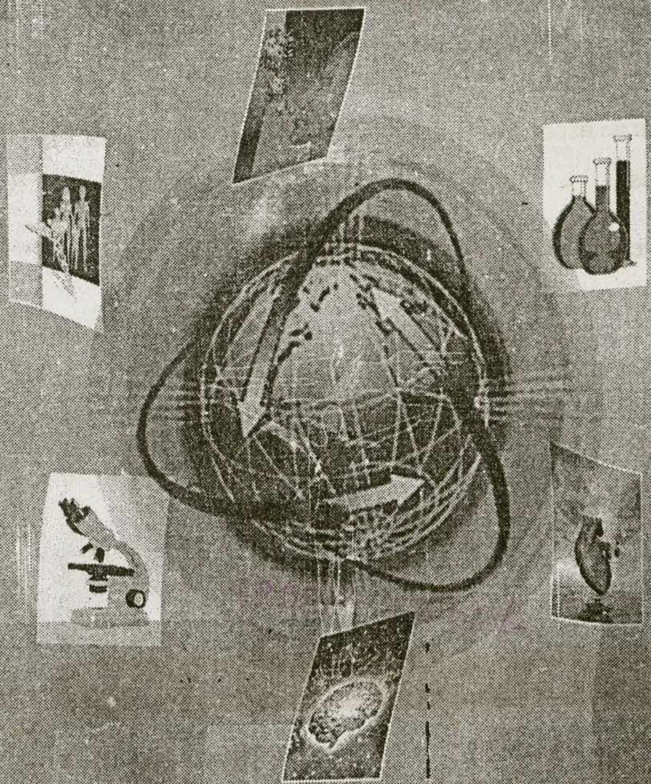
VIGYAN SIKSHAK

The Science Teacher



Volume : 49 ★ No. : 1, 2 & 3 ★ Jan., Feb. & March 2005

39th Annual Conference : Special Issue

All India Science Teachers' Association

VIGYAN SHIKSHAK

The Science Teacher

Volume 49 • No. 1, 2 and 3 • Jan, Feb. & March 2005

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New Delhi – 110004

MESSAGE

The President of India, Dr. A. P. J. Abdul Kalam, is happy to know that the 39th Annual Conference of the All India Science Teachers' Association is being held during December 26-28, 2004 at Patna.

The President extends his warm greetings and felicitations to the organisers and the participants and wishes the Conference all success.

PRESS SECRETARY TO THE PRESIDENT

S. N. Sahu
Director

सत्यमेव जयते

प्रधानमंत्री कार्यालय
नई दिल्ली - 110 011
PRIME MINISTER'S OFFICE
New Delhi - 110 011

17th December, 2004

MESSAGE

The Prime Minister is happy to know that the 39th Annual Conference of All India Science Teachers' Association is being held at Women's Training College, Patna University.

On this occasion, the Prime Minister extends his greetings and good wishes to the organizers and participants for the success of the Conference.

(S. N. Sahu)

Shri Rabindra Prasad Sinha
Organising Secretary,
All India Science Teachers' Association,
Women's Training College,
Patna-800 001

No. : 4/8/117/SHS/2004

सत्यमेव जयते

J. R. GULATI
Ph. : 23017795, 23034601
Fax. : 23792927

23011209
Tel. : 23013211
23034700

SECRETARY
to the Hon'ble Speaker, Lok Sabha
New Delhi

24 November, 2004

Shri Rabindra Prasad Sinha,
Organising Secretary,
All India Science Teachers' Association,
C/o Principal, Women's Training College,
Patna-800 001.

Sir,

Shri Somnath Chatterjee, Hon'ble Speaker, Lok Sabha, thanks you very much for your kind invitation of 11 November to join you at the 39th Annual Conference of All India Science Teachers' Association at Patna.

While it would have been a pleasure for the hon'ble Speaker to be with you at the Conference. I am sorry to convey that it would not be possible for him to do so due to his prior commitments.

Hon'ble Speaker conveys his best wishes for the success of the Conference.

Thanking you,

Yours faithfully,

(J. R. GULATI)

Do No. 240/HDS/2004

सत्यमेव जयते

उपाध्यक्ष, लोक सभा

DEPUTY SPEAKER, LOK SABHA

21st December, 2004

MESSAGE

I am glad to know that All India Science Teachers' Association's 39th Annual Conference is being organized from 26-28 December, 2004.

I congratulate the Association for entering into its 39th year. I understand All India Science Teachers' Association is doing marvelous and wonderful work for the science teachers' community and science education in the country. I applaud the efforts and good work done by the Association.

I wish the people and the organizers of the conference a grand success.

Charanjit Singh

(CHARANJIT SINGH ATWAL)

Shri Rabindra Prasad Sinha
Organising Secretary,
All India Science Teachers' Association,
Women's Training College,
Patna

D.O. No. 241 Addl. PS to MOS (IC) S & T & OD

आजम मियाँ
AZAM MIAN
Tel.: 23316766, 26524756
Fax.: 23316745
सत्यमेव जयते

अतिरिक्त निजी सचिव
राज्य मंत्री (स्वतंत्र प्रभार)
विज्ञान एवं प्रौद्योगिकी तथा महासागर विकास
भारत सरकार, नई दिल्ली
ADDITIONAL PRIVATE SECRETARY
MINISTER OF STATE (INDEPENDENT CHARGE) FOR
SCIENCE & TECHNOLOGY AND OCEAN
DEVELOPMENT
GOVERNMENT OF INDIA
NEW DELHI

30th November 2004

Dear Shri Sinha ji,

Please refer to your letter dt. 11th November 2004 inviting Hon'ble Minister of State (I/C) for Science & Technology and Ocean Development to participate in the 39th Annual Conference of AISTA from 26th to 28th December 2004 at North of Gandhi Maidan, Patna, Bihar. It is regretted that Hon'ble Minister will not be able to attend the conference due to his pre-occupations.

With warm regards,

Yours sincerely,

(Azam Mian)

Shri Rabindra Prasad Sinha,
Organising Secretary,
C/o Principal, Women's Training College,
Patna 800 001.
Bihar

राज्यपाल बिहार
सत्यमेव जयते
GOVERNOR BIHAR

MESSAGE

राजभवन, पटना
RAJ BHAVAN
PATNA-800 022

December 18, 2004

I am happy to know that the 39th Annual Conference of All India Science Teachers' Association (AISTA) is going to be held on December 26-28, 2004 at Patna.

Since ages the teacher has been looked upon by the community as one possessing knowledge superior to that of his students. The status of the teacher reflects the socio-cultural ethos of a society. The teachers' role should be in the direction of developing skills of comprehension, quick decision making, initiating and carrying out innovations and evaluations etc. The role of teacher in India of tomorrow will be as an agent of social change, an innovator, organiser and communication person. He should be a radical reformer of society and education, a creative person and a good coordinator of the future society, exploiting the new technology to the best advantage for the social purposes of education.

I send my best wishes for the success of the Annual Conference.

(Buta Singh)

सदानन्द सिंह
अध्यक्ष
बिहार विधान सभा

2, देशरत्न मार्ग
पटना
का० : 2223856, 2226082
आ० : 2221858, 2222232
फैक्स : 2225343

दिनांक : 15/12/2004

प्रिय सिन्हा जी,

दिनांक 26 दिसम्बर से 28 दिसम्बर 2004 तक आयोजित ***All India Science Teachers' Association*** के सम्मेलन का आमंत्रण पत्र मिला । बहुत-बहुत धन्यवाद । आमंत्रण के लिये मैं आप सबों का आभारी हूँ । पूर्व से निर्धारित कार्यक्रमों में अत्यधिक व्यस्त रहने के कारण, मुझे दुःख है कि प्रबल इच्छा के बावजूद, आपके कार्यक्रम के लिये समय दे पाना सम्भव नहीं हो सकेगा ।

आज के विज्ञान के युग में इस तरह के सम्मेलन की उपयोगिता एवं सार्थकता बहुत अधिक है । इससे नये-नये खोज एवं अनुसंधान की जानकारी भाग लेने वाले शिक्षक सदस्यों को तो होती है, साथ ही छात्र-छात्राओं को भी इसका यथेष्ट लाभ मिलता है । मेरी हर शुभकामना आपलोगों के साथ है ।

आपका यह आयोजन एवं स्मारिका प्रकाशन पूर्णतया सफल हो, यही मेरी मंगल कामना है ।

धन्यवाद एवं हार्दिक शुभकामनाओं के साथ,

भवदीय

15.12.2004

(सदानन्द सिंह)

सेवा में,
श्री रवीन्द्र प्रसाद सिन्हा,
द्वारा प्रधानाचार्या,
वीमेन्स ट्रेनिंग कॉलेज,
पटना - 800 001.

A GOOD TEACHER IS AN ASSET OF THE SOCIETY

Professor J. N. Chatterjea, DSc, FNA

INAUGURAL ADDRESS OF THE 39th ANNUAL CONFERENCE OF ALL INDIA SCIENCE TEACHERS' ASSOCIATION HELD AT PATNA ON DECEMBER 26, 2004. —Editor

I have been associated with All India Science Teachers' Association for a long time. In 1965, I was called upon to deliver the **'Krishnan Memorial Lecture'** here at Patna. I have been a teacher of chemical sciences for nearly 60 years, now an Emeritus Professor of Patna University. I have taught the students for more than two generations and I have noted how explosively scientific knowledge has grown from mid-forties of the last century to the present time. It is common that a scientific task considered impossible to carry out is often interrupted by someone actually accomplishing it.

The problems facing the teaching of science and the teachers of science are many and I shall mention a few in this brief address. Ours is a developing country and we have to be alive to the present science scenario so that we do not lag far behind the levels of developed countries. Since our independence, thanks to our **National Science Policy,** we have now a broad base of science education in the country. We boast of having the third largest scientific and technological man- power in the world, but can we boast of the quality ? Certainly not. Excellence in science has to be measured in the international context. In India we have a long tradition of scholarship and creative thinking but how many of young talents have been recognized and tapped for gainful purposes? The unrecognised lot leave the school or college in search of ways and means for fending themselves.

The foundation of science education is laid in the school education. Every effort has to be made at the school stage to inculcate scientific temper, scientific spirit and the value of enquiring mind which require objectivity and honesty in work. Barring some exceptions, most of the schools and colleges are poorly equipped and poorly staffed. This is apparent in this state where we have no fund to procure current science Journals and hardly any money for procuring new equipments or chemicals, let alone the timely payment of monthly salaries to the teachers. In consequence, teachers are magnetically drawn to the coaching institutes which are thriving at the cost of the pockets of parents of students.

We should not forget the supreme importance of a teacher. **A good teacher is an asset of the society. He sows the seeds of excellence.** A teacher' s influence on the student lasts a life-time. What remains in the student' s memory is the stamp of his teacher' s character and personality and his ideals to emulate.

CHATTERJEA, JNANENDRA NATH

Born on September 19, 1923 at Patna.

Educated up to the M. Sc. (Organic Chemistry) stage in Patna annexing all the prizes and medals of Patna University. Proceeded to Oxford in 1946 to work under **Sir R. Robinson, NL and President of the Royal Society of England.** Qualified for D. Phil. Degree in 1949 and D. Sc. Degree (P. U.) in 1960. Was appointed Professor of Organic Chemistry (1960-65) and University Professor and Head (1965-72). Deputed as the Director, Indian Lac Research Institute, Ranchi (1972-75), Head, Department of Chemistry, Patna University (1975-83). Retired in 1983. Visiting Professor, Magadh University (1983-84), Bhagalpur University (1984-85), **Royal Society- Nuffield Foundation Bursar** (1963-64) at London University and lectured in Universities of W. Germany (1985), Emeritus Professor, Patna University since 1998.

Member, Alembic Club (Oxford), Fellow, National Academy of Science, Allahabad since 1968, Institution of Chemists (India) since 1962, Royal Institute of Chemistry, London, since 1960 (now discontd), Indian National Science Academy, New Delhi since 1973.

Awards:

Das Gupta Medal of Indian Chemical Society (1957), H. K. Sen memorial medal of Institution of Chemists (1992), NRDC Award New Delhi (1984).

Carried out researches on:

(a) Synthesis of Thioindigoids.
(b) Synthesis of oxygen heterocyclics in relation to natural products, such as Coumestans, pterocarpins, brazilin, isochromenes, isocoumarins, homoisoflavonoids etc.
(c) Condensed nitrogen heterocycles.
(d) Chemistry of lac resin.
(e) Leather chemistry.
(f) Fungal metabolites, and
(g) Received the **life time achievement award** of the Indian Chemical Society in 2001.

Published over 150 scientific papers in National and International Journals.

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The New Perspectives of Science Education

Prof. Vinay K. Kantha

[The paper presented by Scientist and an eminent educationist, Prof. Vinay Kumar Kantha in the inaugural session of AISTA. Prof. Kantha introduced the focal theme of the AISTA's 39th Annual Conference 'Scientific and Technological Awareness (STA) for All' —Editor]

Fellow teachers, I deem it as a rare privilege to address this enlightened gathering on this important occasion. I undertake this responsibility with considerable trepidation as I consider this task calling for an expertise higher than mine. I am conscious of the fact that this valued Association will celebrate its Golden Jubilee in a couple of years and in the course of these years it has contributed significantly to the field of science education in India. Today that there is a renewed emphasis on universalisation of elementary school education with a core curriculum which includes science, the need and importance of improving its quality is obvious. But perhaps even more important is the need of rethinking its scope, approach and methodology when science is losing some of its sheen.

Pursuit of scientific research is no longer an exciting career option of the young in our country and if we move to the higher realms of academic debates, 'in decline is the grandeur of science which reached its zenith in the forties and fifties of the century' as noted social scientist Ashis Nandy observes' If the dominance of modern science has led to the marginalisation or derecognition of several traditions of human knowledge, still beneficial to a vast bulk of world population, its inability to benefit them all raise doubt about its utility. For many, modern technology is unable to deliver the goods and its inability has made its role in human violence and exploitation more conspicuous and hence the questioning of modern technology with its adjunct, the modern science. From the seventies of the last century, notably beginning from the **Stockholm conference on environment in 1972,** the perceptive observers have realised that nature cannot be conquered by using science and technology. Man is himself the child of nature and its conquest would be self destructive. We would do well to teach our younger generations the need of protecting environment for the sake of your own survival and of the generations to come. At Tibilisi in 1977, the objectives of environment education were formulated around four terms - Awareness, Skill, Attitude and Participation-each one linked to the need of addressing environmental problems, which loom large over the world today. A few months back, here in India, the Hon 'ble Supreme Court has made teaching of environment compulsory both in schools and colleges. It is in the above context that I have chosen my topic—*The new perspectives of science education',*

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1 *Ashis Nandy, Science in Utopia : equity, plurality and openness, IIC quarterly, Winter 2001, Spring 2002, p. 91*

Before I take up issues relating to curriculum, which are many and varied, I intend to briefly dwell upon some of the basic questions relating to science and its studies. I would humbly submit, what may appear as blasphemy to many worshippers of modern science, that science is neither autonomous, nor value-free and objective. Science is inextricably linked with society and direction of scientific advancement is often a matter of political or economic choice and it has been more so in the recent times. I am reminded of a sentence written by Tolstoy a century back and quoted by Huxley is one of his essays on Science. Tolstoy observed that so long as the arrangement of the society is bad, as ours is, every advance of science, makes it worse and more exploitative. He might well have added that it is not merely the question of use or abuse of science or technology, rather even behind that, it is determined by the choice of areas of science enquiry or technological development. Science presumably ought to be harnessed for the well- being of mankind, but it seems to have progressed faster where it equips somebody or some agency, including nation-states, with greater power or economic privileges. That is why the tendency to sanctify scientific knowledge is at some level arrogant, manipulative and even dangerous.

In a book named *Chaos, Fractals and Self - organization* in popular science series Arvind Kumar has very lucidly described some of the new ideas emerging in the non-linear science. He rightly notices new perspectives in them on complexity in nature.The book touches upon Ilya Prigogine's pioneering work on dissipative structures and describes chaos, fractals and self- organisation as concepts of the same underlying theme : Complexity.There is a small chapter towards the end of the book on reductionism, and holism in which he notes that despite its impressive achievements, reductionism of late, has come under increasing attack. He goes on to explain that the newly emerging ideas provide a holistic line of enquiry according to which higher level laws need to be discovered independently rather than in terms of behaviour of parts. Recent advances in biology again establish the need of holistic interpretations, rather than always relying on the reductionist approach. In sum, in addition to the generally popular reductionist method of scientific enquiry, there is a strong case today in diverse fields for an independent holistic approach. Ecology is not the only discipline where it is needed or it works. It extends to biology as well as physics with equal compulsion.[2]

Fritjof Capra is a noted physicist and he has written a great deal on the need of developing a new paradigm for science — a new vision of reality, which he claims to be supported by our current theories of matter. He writes "The new concepts in physics have brought about a profound change in our world view : from the mechanistic world view of Descartes and Newton to a holistic and ecological view, a view that turns out to be very similar to the views of mystics of all ages and traditions."[3] He talks about the crises the nations and societies around the world face to-day : "Most of our economics produce high inflation and unemployment, with undiminishing levels of poverty and starvation, there is an energy crisis, a crisis in health care, an environmental crisis, a

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[2] *Arvind Kumar, Chaos, Fractals and Self-Organisation, NBT (1996).*

[3] *Fritjof Capra, The New Reality, IIC Quarterly winter 2001, spring 2002, p. 72.*

rising wave of violence and crime, and so on. I believe that they are all facets of the same crisis, and that this becomes essentially a crisis of perception."

Capra 's conclusions may appear to be too radical, but there are enough reasons now to shed blind faith in science and technology to the total exclusion of ethical concerns and human values. The holistic character of environmental education provides an alternative framework of pedagogy for science teaching today. The problem with our science education is that we generally fail to provide it even in the old conventional mode. We are unable to give them adequate scientific knowledge or kindle spirit of enquiry among our children in our schools and colleges, obsessed that we are with the coverage of syllabus and the performance of students in the examinations. In order to understand the present scenario of science teaching in India it will be worthwhile to have a look at curricular issues involved in science education.

CURRICULAR ISSUES :

Kothari's following comments on curriculum made about four decades back still remain relevant :

"Against the background of the striking curricular developments that are taking place abroad, the school curriculum in India will be found very narrowly conceived and largely out of date. Education is a three-fold process of imparting knowledge, developing skills and inculcating proper interests, attitudes and values. Our schools are mostly concerned with the first part of the process-the imparting of knowledge and carry out even this in an unsatisfactory way. The curriculum places a premium on bookish language and rote learning makes inadequate provision for practical activities and experiences and is dominated by examinations, external and internal. Moreover, as the development of useful skills and the inculcation of the right kind of interests, attitudes and values are not given sufficient emphasis, the curriculum becomes not only out of step with modern language but also out of tune with the life of people. There is thus the urgent need to raise, upgrade and improve the school curriculum".

One point that needs to be highlighted about the curriculum-related recommendations of the Kothari Commission is its clearly stated preference for a large measure of flexibility, which tended to be ignored gradually. The report was critical of even the state-level uniformly prescribed curriculum which it said".... cramps the freedom of the headmaster and teachers and renders experimental work almost impossible. "

It is true that this report was very keen on the up-gradation of the curriculum (which may have contained the seeds of the over increasing burden on the child), but it was clear that the "curriculum should be related to the quality of teachers, the facilities available in the school and the needs of the students with reference to their socio-

I[illegible]ing the focal theme : Prof. Vinay Kr. Kantha

Addressing the inaugural session : Chief Guest
Sri Vijay Prakash, IAS, Secretary Primary & Adult
Education, Bihar

Eminent educationist and Patron of AISTA Prof. Ramji
Pd. Singh greeting the conference

Vice Chancellor of LNMU, Darbhanga, Bihar,
Prof. Rajmani Prasad Sinha addressing the delegates.

Presidential address : Dr. S. N. Giri

General Secretary report : Dr. M. M. Chel

Dr. Amitabh Ghosh, Director, B.C.S.T. and Indira Gandhi Planetorium, Patna, presenting his view.

Hon'ble teacher MLC Shri Basudeo Singh greeti the conference

Dr. Vijay Krishna, Rtd. Director General, Botanical Survey of India addressing the conference.

Shri Rabindra Pd. Sinha, Organising Secretary, Conducting the Session.

Eminent social scientist Prof. Daisy Narain sharing her view in the conference.

Mrs. Mridula Prakash delivering in the conference.

[illegible] Raziya Hussain, Vice President AISTA speaking on the occasion.

Dr. (Mrs.) Chanchala Kumari, Principal, P. N. Anglo H.S. Patna, Presenting a vote of thanks.

A view of the delegates

A view of the delegates

A view of the delegates

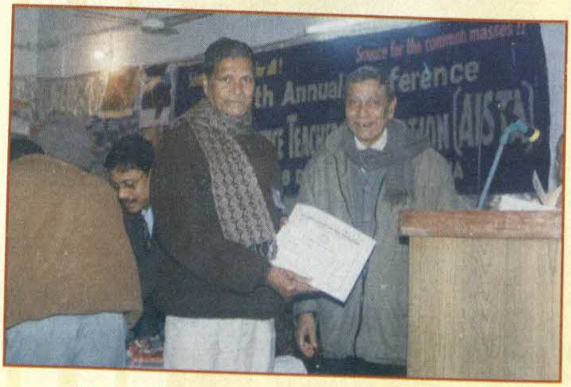
A view of the delegates

Mr. R. N. Jha, Ex - Vice President AISTA receiving certificate from Prof. R. P. Singh

Prof. Raziya Tabassum, Senior BPSC member addressing the valedictory session

Mr. K. K. Thakur of BEP receiving certificate from Prof. R P. Singh

Mrs. Raziya Hussain, Vice President AISTA, receiving certificate from Mrs. Purabi Dutta Gupta and Prof. R. P. Singh



Mr. R. L. P. Chaurasia receiving certificate from Prof. R. P. Singh, Patron AISTA

Prof. Asit Das, Dean Studetnts Welfare Kalyani University West Bengal addressing the academic session.

economic background. " The commission even went to the length of suggesting that "the solution lies in making it possible for schools to devise and adopt a curriculum to their own needs and to vie with one another in upgrading them. Though the Kothari Commission had favoured the introduction of a uniform 10+2+3 structure nationwide it was very conscious of the need of a built-in flexibility in the system.

For appreciating fully curriculum-related issues in science education the meaning and scope of the term should be clearly noted. In a book on Environment Education published by Prativesh, the term has been defined as follows :

'By the word 'curriculum' we mean an ordered structure of learning oppportunities and experiences defined usually in an institutional context. Whatever the agenda, aim and objective of education, in any educational institution that is meant for a certain category of learners, one of the primary questions is what to teach? The curriculum connects the practical task of teaching and the practical aspect of learning with the goals of education.

Sometimes we use the word 'syllabus' rather mistakenly in the same sense. Syllabus is a narrower term that refers to the specific delineation of the content of the teaching. This in turn relates to periodic evaluative mechanisms like the duration of a course or examination. Curriculum, therefore, is a more abstract category than syllabus. '

Recently under the instruction of Hon'ble Supreme Court, NCERT has come out with a framework of environment education curriculum for different stages of school education. The framework includes five components, namely, (a) Expected Learning Outcomes (b) Contents (c) Exemplar activities (d) Teaching-Learning Strategies and (e) Evaluation. In deed, without outlining strategies of its transaction, the discussion on curriculum remains incomplete. Curriculum should include answer to both questions — What to teach ? And How to teach ? Besides, there should be an understanding as to the very purpose of a subject being taught as well as the ways to evaluate the learning outcomes.

MEANING & PURPOSE OF SCIENCE EDUCATION

Coming to science education we can possibly start from its meaning and purpose. In broad sense science itself can be viewed in at least three distinct ways. First of all, it is body of knowledge pertaining to the physical world around us, both living and non-living. A set of subjects are thus labeled as science and there are certain facts, concepts principles and process to be learnt in each subject. Physics, chemistry and biology are three major disciplines generally included at the school level, many more specialize disciplines can be added at higher levels. This identity of science is the most commonly accepted by students and teachers alike. But in the second way science can be looked upon as a method of enquiry and exploration. Empirical observation is generally the basics of science. Here comes the importance of experiments and measurement, which in turn brings in Mathematics as an aid to science. The field of observation can be restricted to the laboratory or could be opened up in the entire world. Nature by all means is the largest laboratory and sensory organs the first instruments. Let the child learn to use this instrument, observe and collate data. Let science be related to the experimental world of the child. It should arouse his interest and quench his curiosity with which every child is born without exception. Method of science further relies on formulation of hypothesis and a chain of flawless reasoning. As a child grows in age let him gradually understand the ways of discovering scientific truths in this particular manner without indeed necessarily denigrating other ways of acquiring knowledge and belief. If a child explores on his own and learns to think he can start appreciating a laws of science a great deal more. These laws are verifiable and results are predictable. Further observations are supposed to conform to predictions for establishing the validity of laws. Teaching science means teaching a child the method of scientific discovery and reasoning which he can then apply to a variety of situations.

This second meaning of science is often a casualty, when teachers and students limit themselves to textbook and examinations. **Albert Einstein** once remarked tersely 'knowledge is dead; the school, however, serves the living. ' He had another piece of advice — *In the matter of physics, the first lessons should contain nothing but what is experimental and interesting to see. A pretty experiment is in itself often more valuable than twenty formulae extracted from our minds; it is particularly important that a young mind that has yet to find its way about in the world of phenomena should be spared from formulae altogether.*[4]

There is a third aspect of science, which is no less important than the first two in the context of school education. Science is an approach and inheres a value system. Alongside commitment to truthfullness, there is an utter humility that it demands. Science should not be dogmatic, as it often turns out to be. A sense of wonder is the beginning of science, innocent excitement of discovery its reward. Let the child imbibe these values in the course of study of science, which school education fails to ensure currently.

METHODOLOGY &TEACHERS' ROLE:

Besides the suggestions implicit in the foregoing discussion it needs to be emphasized that science education should be more broad-based and should rely more on active involvement of learners. Rote learning needs to be replaced by a learning which leads to its understanding and use. We all have heard the story of a flock of parrots being taught by a sage how a hunter will cast his net, sprinkle grains warning them not to get caught. Chanting the words they all did precisely for which they were forewarned. We see it happen among most learners after their bookish acquisition of

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[4] *Selections from and on Einstein, INSA & CSIR (1984) p. 15*

knowledge. Often we fail solutions to our daily life problems scientifically, even as many of us including policy makers have blind and dogmatic faith in science. **Yashpal Committee** report, headed by a physicist himself, concluded that Indian child is made to read a lot but comprehends very little and consequently carries a 'burden of incomprehension. ' It is welcome that NCERT has also started promoting activity-based learning on different subjects, including science.

The focus of education ought to shift from teaching to learning and from stress on 'knowing' something to mastering 'the process of learning.' This can be better done when learning is through doing and active involvement of learner. Let him develop his process skills. Teachers' role will be to design and create an active learning environment and to give the learner a chance to learn on his own and guide or induce him,only when necessary. Alongside the new methods of teaching, the mode of assessment will have to be necessarily revamped to bring it in line with the overall approach. Mere year-end examination in theory and practical would not suffice. Teachers will have to develop and use new teaching-learning materials and testing tools. Further, a good teacher can also help the child to learn directly from nature and society, the largest and most comprehensive book indeed. Instilling a social consciousness and desirable value system have to be part of design of teaching-learning strategies.

In a brilliant article, famous astrophysicist and science writer Jayant V Narliker notes that creativity in science and technology flourished in Europe and not in India. He explains this with a series of examples including one in which he shows how Aryabhatt gave a revolutionary concept regarding the motion of earth, but it was simply ignored. Narliker observes that creativity ultimately requires a human brain and there is a real shortage of such motivated persons. I beg to disageree. There is no dearth of brains, but we have failed to create environment conductive to their creative use. Schools and Colleges can be the best places to ignite minds and unleash creativity on a mass scale. More than money it requires transformed pedagogic practices. We expect our children always to do things right. Dare them to dream, to think on their own and to go wrong many times till they find out the right.

Doing and thinking are two most precious activities to illuminate the process of learning. Experiments are referred to in teaching, even if not much room is provided for it. Thinking perhaps is an even more important activity, altogether neglected in our scheme of education. I am reminded of an interesting episode narrated by Richard Feynman from his chilhood days. His biographers John Gribbon & Mary Gribbon tell the story and its message is as follows :

Imagination and thinking were what the pre-teenage Richard Feynman (like the adult Richard Feynman) was superb at. In one of his favourite anecdotes (or parables, if you prefer), he told how while he was in Cedarhurst he learned how to repair radios. Radio sets were simple in those days, and he had started out, in Far Rockaway, by building his own crystal set, then moved on to fixing some *problems for the family. Word spread, and friends and acquaintances used to call him in, rather than go to the extent of calling a regular radio repairman. The highlight of the story comes when a total stranger asks the kid to fix his radio, which makes an awful noise when it is switched on, but then settles down when it has warmed up. The kid paces up and down, trying to work out what is going on, while the owner of the radio gets more and more agitated, muttering about how stupid he has been to ask a little kid to do a man's job, and asking what Feynman is up to, to which the kid replies, 'I' m thinking.'*

Eventually; having thought things through carefully; the kid realises that problem might be solved by reversing the order of two of the tubes (valves) in the radio. He swaps the tubes, switches it on, and it works perfectly; The owner fo the set is enchanted, completely converted to the cause of the budding genius, and gets him more work, telling all his friends, 'He fixes radios by thinking![5]

In conclusion, I would like to remind you all with all humility that science will have to be recast in India if we have to realize our potential as a nation. If science has to be harnessed for taster technological advancement, capacity for which has already been displayed in IT sector, teaching practices should change. Perhaps even more important is the need to harness science for the well- being of the entire society, today and for posterity. This calls for an alternative vision of science and its teaching, more humane and holistic.

Delor's Commission in its report titled '*Learning : The Treasure Within*' talks of four pillars of learning : Learning to know, learning to do, learning to live together and learning to be. Perhaps it can be extended and rephrased to give a larger vision of education. The four strategies could be : 'Learning to do, Learning to think, Learning to dream and imagine and Learning to love.'

Lets have the last word from Einstein, the scientist par excellence on the purpose of education, which surely includes education in science :

'The most important human endeavor is the striving for morality in our actions. Our inner balance and even our very existence depend on it. Only morality in our actions can give beauty and dignity of life.

To make this a living force and bring it to clear consciousness is perhaps the foremost task of education. [6]

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[5] *John Gribboon & Mary Gribbon, Richard Feynman : A life in Science, University Press (1997) p.12*

[6] *Selections from and on Einstein, INSA & CSIR (1984) p. 24*

JOSHI MEMORIAL LECTURE

Dr. A. C. Joshi Was A Repository of All Human Values

Professor R. P. Singh
Patron, AISTA

I sincerely thank you for inviting me to deliver Joshi Memorial Lecture at your 39 th Conference which is being attended by experienced and committed science teachers from all parts of the country. My first reaction was to politely show my inability to take up this job as it requires a man with deep study of science to speak before this august gathering who are bubbling with rich new ideas and are directly in touch with the children and adolescents of 21 st century who are far more intelligent than the boys and girls of my teaching days when I was dealing with them. But because of my very intimate personal and professional relationship with Dr. A. C. Joshi who founded the AISTA in 1956 with whom I worked closely till his lamentable death in 1971, I opted to avail the opportunity to pay my humble homage to his everinspiring memory. Dr. A. C. Joshi was a scientist in true sense of the term and possessed the subtle quality of head and heart which is not possible for me to decipher. He taught Botany in BHU and shifted to Lahore joining PES and taught in Government College Lahore as Professor of Botany. After partition of India, Dr. Joshi came to India and joined a Govt. College in Dharamshala as its Principal. There he developed an interest in School Science. Soon after he was elevated to the post of Director of Public Instruction of Punjab. After some years he became Vice Chancellor of Punjab University, Chandigarh. After completing his term he joined as Vice Chancellor of newly started University of Kurukshetra. The rose garden of Kurukshetra University, one of the best rose gardens of India is named after him as Dr. A. C. Joshi Rose Garden. For 17 years he worked as educational leader in various capacities, and in 1965 he joined Planning Commission. After a short stint in Planning Commission he became Vice Chancellor of BHU. He was elected President of the Indian Science Congress for the year 1969 and presided over its Powai (Mumbai) session in January, 1970. Dr. A. C. Joshi was a repository of all human values. Every delegate attending the annual conferences or executive committee meetings was paid railway fares of both ways. He did not hesitate to use his personal influences for facilitating the activities of AISTA. I was informed of his sad demise, at London where I was working as a senior fellow of London University Institute of Education, by the Secretary of the AISTA and a few other friends. The rest is history.

Dr. Joshi took no time to get a constitution and bylaws of the Association. Care was taken from the very beginning to have a member in the Executive Committee from each state of the country. Dr. Suresh Chandra Shukla of the University of Delhi was the first Secretary. There was a tacit understanding to locate secretariat at Delhi to facilitate the release of grants from various national agencies which were all located at Delhi. Since the year 1956 I had been closely working with him and I can say with a certain amount of confidence that he championed the cause of not only science education but quality science education in schools and stressed the need of introducing science in integrated form right from the very first year of schooling and making it a core subject along with languages, social studies and mathematics. This was, at later period, incorporated in the recommendations of the Indian Education commission Report (1966) and finally found a place in the National Policy on Education (1969). School Science remained grossly neglected during the colonial rule; but after independence, educationists and planners realised the importance of science and technical education for national development. A quote from Dr. Joshi's speech at the 10th annual conference in 1965 will strengthen the foregoing statement, "After Independence, the study of everyday science or general science was included as a compulsory subject in the school curriculum in most states and Secondary Education Commission (1953) strongly recommended the strengthening of Science Education as an integral and compulsory subject in schools. The commission suggested that the pupils at the Middle (Upper elementary or Junior secondary) stage should be introduced "in a general way" to certain broad aspect of science, general science including mathematics should then be introduced in the first two years of higher secondary course as one of the compulsory subjects. A more specific course was proposed in specific subjects like Physics, Chemistry and Biology for those who took science as an elective subject. In the light of those recommendations a programme for the introduction of elective science at the higher secondary stage was sanctioned in the last year of the first Five Year Plan i.e. in 1955-56 in 214 schools. Provision was also made for improving facilities for science education in 1,100 other schools at an estimated cost of Rs. 27 million. The All India Council for Secondary Education was set up by the Ministry of Education soon after the publication of the Secondary Education Commission Report to introduce various programmes of quality improvement in Secondary schools in the country and establish Extension Services department, in the training colleges, and the council also took up various programmes of science education." During the second plan 2,310 multipurpose schools were established and science as an elective subject was introduced in about 5,600 out of 17,200 Secondary Schools in India which was less than one third of the schools existing at that time. It started modestly but in course of time it gained momentum.

It is a truism that no programme of educational developement and reform can be possible without active and committed participation of teachers. Dr. Joshi relentlessly convinced the implementing and monitoring agencies and even the Planning Commission to involve teachers at all the stages of programme implementation. He organised the AISTA as a purely professional body. The Executive committee meetings were held regularly and at times for 5–6 days when the details of some new programmes were worked out. The Summer Institutes for Science Teachers and Science Talent Search programmes were discussed in the AISTA and then suggested to the NCERT and

Ministry of Education. Setting up of Science clubs in every school was a brain child of Dr. Joshi and it was taken up with the help of Council for Science Education which later on merged with the NCERT. Science clubs were organised in schools through Extension Services Depatement attached to the Teachers Training Colleges.

If we examine our efforts in science teaching in historical perspective it is found that in India it started 100 years after the same type of activities started in U. K. Academic Science started in U. K. in 1543 but the foundation of Gresham College in 1597 is a landmark. The great exhibition of 1851 may be considered as a milestone in science education. It revealed that superiority of U. K. lay in natural resources but in applied science Germany was far ahead of U. K. This age may be called great as it included Spencer, Mill, Darwin, Huxley, Ruskin, Dickens, Playfair - to name but a few - among its prophets and the fact that many of them clamoured for the study of Science. During the same period in some primary schools and some secondary schools including University College School and Rugby teaching of Science was started. Public Schools and Grammar Schools in the first stance avoided science education. Soon after they also fell in line, for Huxley and Faraday made great efforts. They believed that scientific and technological development of a country is possible only if all the people living therein are aware of the basics of science and its method.

Dr. Joshi not only pioneered the cause of school science but convinced the contemporary scientists to attend the annual conferences and several eminent scientists attended the sessions and delivered lectures on important topics and aspects of science. I still remember a few of them - K. S. Krishnan, D. S. Kothari, Vikram Sarabhai, Raja Ramana and B. D. Nagchowdhary among others. The Product and Process of science - the two aspects of science were taken care with almost equal weightage. Along with scientific method Dr. Joshi emphasised the need of updating science curriculum for Indian schools. The year 1959 shocked the western world when USSR proved its superiority in space science. The scientific community in the USA deliberated on the issue and various committees consisting of eminent Professors were constituted to revise science curriculum for schools. In India, NCERT formed study groups for revising science curriculum in which AISTA was also involved through Dr. Joshi. The Indian Education Commission (1966) was also alive of the problem of science curriculum revision. It states,

"Even in educationally advanced nation like the USA, where the traditional curriculum had been radically transformed long ago under the impact of progressive education, the content of the school courses is being challenged by university men and a new reform movement has been started which may bring in sweeping curricular changes in school education." The commission has further observed with regard to the Indian situation that present curriculum places a premium on bookish knowledge and rote learning, makes inadequate provision for practical activities and experiences and is dominated by examinations; and there is an urgent need to revise, upgrade and improve it.

Dr. Joshi was a crusader of curriculum change. He argued for the necessity of change in the curriculum because of development of psychological research and experimentation. The greater understanding and appreciation of child development, of individual differences among children, of the learning process and of the influences of satisfaction and dissatisfaction thereon, of children's interests and capacities and, of motivation and also their personality traits affect learning considerably. The task of reforming curriculum in all the disciplines of science was well taken up; a standard curriculum was produced.

In all the curriculum, process of science was taken care of, and because of primary science, scientific literacy made a faster jump. The people in general now realise the importance of science. But much more has to be achieved. Designating 2004 as a year of scientific awareness may help people to give importance to process of science which is based on scientific method. The organisations which adopted scientific method made a much faster progress. Dogmas and superstition create barriers in progress.

To understand the method of science or the process of science properly, we have to remember 'everlasting why ?'. Science is the everlasting interrogation of Nature by Man. It certainly did not begin with Aristotle and will not end when someone produces the 'Unified Theory'. Even a theory assumes the stature of laws because the consistencies seem to leave no room for doubt, it is not definitive; it is just waiting for the new amendment. Newton's laws of gravity remained widely undisputed for two centuries until the observed behaviour of the planet Mercury did not conform exactly to them. There was a discrepancy that Einstein Theory of Relativity helped explain, and to that extent the laws had to be modified. Science, therefore, is present verification without ultimate certainty.

The interrogation began when early man overcame his superstition and began to ask 'why ?'. There is an innate curiosity and the man wants to know what he sees around and the changes in nature take place. There was no teacher who could snub the curiosity by saying "you cannot understand that until you know all about kinetics and dynamics". He noticed an object or event and made a mental note of it and thus he became observer and he looked again to make sure; and he became a fact finder. When he started repeating such actions, he started establishing relationship and he became a theorist. He searched and researched, testing his observations he became an investigator. He began to assemble his ideas and to relate what he saw to other forms of experience; thus he became a natural philosopher. He exchanged his observations and his ideas with others who might accept his facts but dispute his interpretation of those facts. Thus there developed a dialectic. That was the beginning of the scientific debate that distinguishes the accretion of experimental findings from hypotheses and theories based on those findings. Since, Science is nonauthoritarian and upholds no dogma, it is perfectly respectable and indeed essential to the dialectic.

"God is subtle but He is not malicious" said **Einstein**. Or to put it another way, Nature is reticent about revealing its complex secrets, but is never perjured. If the answer is missing, it may be that the question has not been asked in the right way. Given the right question properly posed, Nature will reveal the right answer in the course of time. For example, **Earnest Rutherford**, in a lecture at the Royal Society in 1920 offered laboratory evidence that the long range particle he had released in 1919 from the nitrogen atom by bombarding it with alpha particles was a proton - the nucleus of the hydrogen atom - and was present in the nuclei of all atoms. The observed reactions of the proton, which has a positive charge were, he said, consistent with the conclusion that there is another particle with no electrical charge. Was there such a particle ? In 1932 his colleague **James Chadwick**, came through with the answer. He provided experiemental evidence of the existence of the predicted particle – the neutron. Rutherford's approach was always that of experimentalist. Theories, he maintained, were useful tools only in so far as they explained the established facts, or data that could be so established. In suggesting that the proton would be linked with another particle, he was, in effect, saying, "I have the bolt, find me out the nut".

This leads us to process of science which means how hypotheses are accepted or rejected after that how theory is built. **Sir Francis Bacon** can be fairly said to have resurrected the scientific method which is the heart of scientific process. He insisted on experimental investigation. He himself was scarcely a laboratory scientist, although he died as a result of an experiment. His writings spelt out what now are accepted principle of modern science, rejecting the deductive or thinking-off-the-top-of-the head principle in favour of inductive or take-off-your-coat principle. He insisted that the man of science must observe and choose his facts; he must frame hypothesis that links them together and provides a pausible explanation of them; and he must carry the numerous checks or repeated experiments to support or deny his hypothesis. Trained as a lawyer, Bacon applied to science the laws of evidence or the burden of proof.

A. N. Whitehead once quipped that the greatest invention of the nineteenth century is the invention of the method of invention. This was a technology that icreasingly brought science into the industrial arts and crafts. So there came about a hierarchy of science - pure or academic science, seeking knowledge for its own sake; oriented fundamental science research within a frame of reference, applied or programmed science which is a reserve with a practical purpose and technology which is the transfer of scientific knowledge. The latter three are dependent upon the first one. Any country in order to give impetus to scientific and technological advancement should encourage the best minds to pursue excellence in pure science. It is lamentable that our best minds are going for softer options motivated by employment market. The danger bell is ringing. At the same time it has to be kept in mind that there is close relationship among all the variants of science. The theoretician adjusts his parameters on experimental evidence; the experimentalist responds to the theory; technologist reacts to both-in creating his hardware, and the hardware itself stimulates theoretician and experimentalist (just as academic science would be crippled significantly without the computer, so the computer was derived from mathematical principles that the electronic engineers activated). With its rapid accumulation of knowledge, with its aggregation of new discoveries, and with its impetuous conversion of desk and laboratory findings into practical innovations, the fantastic acceleration of scientific progress has arisen through feedback.

The objective of what has been said above is not to qualify the science teachers to join the priesthood. It is hoped that it will offer an insight into the process of science that will help him to take part in open ended debate, rather than eavesdrop on a closed seminar, and help him form his own judgements on what may happen and what direction the science is taking and ultimately leading to help students in choosing the science or nonscience career. Though it is interesting to know how scientific revolution became possible by the ceaseless efforts of scientists adhering to the rules of scientific method, experimentation, observation, data analysis, checking and rechecking, inferences and theorisation. Scientific method is now used in every sphere of human activity from army to business to agriculture. This is the essence of scientific culture including scientific literacy or scientific awareness. The nation which followed this, progressed. It is, therefore, essential for both scientists and nonscientists. This leads us to conclusion that science education is for all, forms may be different. And, because science is in the curriculum as a cumpulsory subject right from the beginning of schooling, I would in the last of this paper like to share my ideas with you on the approach which would be appropriate at elementary level of schooling.

So far as the elementary science is concerned, we have not yet been able to develop a curriculum for science suitable for the children up to the age of 14 years which may ensure the maximum learning based on formal as well as nonformal self investigation. Other countries in the developed world have several variants of science curriculum for primary level. The British Council's curriculum for elementary school children based on the Piaget developmental stages seems to be very relevant and develops in children a questioning habit. The curriculum for this stage should be a result of integration of theory and practice. Integration in children's learning, it seems to me, is two fold.

1. It is another way of saying that a child does not divide his world but, as he explores things and ideas that fascinate him, he crosses subject boundaries, unaware that he is investigating historical, geographical, scientific, mathematical fields, and extending his use language as tool to report, order and refine his experiments.

2. The other aspect of the integration is the one in which the subject matter that is presented to the children is selected in relation to the stage of each child's development, enabling the child to move in a world they can understand and, through their investigations deepen their understanding and extend their knowledge.

Together these produce a situation that may aptly be called living learning, because the work grows out of incidents that are vital to the children and result in a shared progression, an unfolding of knowledge in which children and teachers interact in relation to the demands of the moment. The teacher is responsible for making the provision within which the child can work, for providing supporting materials in the form of books, films, filmstrips etc., suitable apparatus and equipments. It is also a part of a teacher's responsibility to give depth and breadth to a study by skilfully introducing aspects that do not arise for some children. Teaching science to children is the most difficult and stupendous task which is yet to be realised by the planners and administrators.

In the end, I would like to suggest to my fellow teachers to take science as a game – both indoor and outdoor games. The Nature is our best laboratory. Thus scientists, future scientists and citizens are astonishing pattern makers, truth spinners. By treating science as game we can hope for making more and more creative persons.

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VARIOUS SUB-COMMITTEES OF THE ORGANISING COMMITTEE

SUB-COMMITTEE		CONVENER
1. Venue	—	Prof. (Dr.) Saroj Bala Sinha
2. Academic	—	Prof. (Dr.) Jayashree Bhattacharya
3. Souvenir	—	Mr. Krishna Nand Pande
4. Finance	—	Mr. R. L. P. Chaurasia & Mr. P. C. Gupta
5. Cultural	—	Mrs. Shila Kumari & Shah Hassan Imam
6. Science Exhibition	—	Mrs. Meena Gupta & Kumari Maya
7. Press & Media	—	Mr. Vinod Singh
8. Food	—	Mr. Bameshwar Sharma & Mr. Mukhtar Singh
9. Accomodation	—	Mr. Vijay Kumar Singh
10. Liaison	—	Mr. Ashok Kumar
11. Transport	—	Mr. Raj Kumar Jha
12. Registration	—	Mr. Md. Zahiruddin and RamNaresh Rai
13. Volunteer	—	Mr. Nagendra Singh & Mr. Ram Ayodhya Singh
14. Reception	—	Dr. (Mrs.) Pushpa Jha
15. Certificate	—	Mr. Seraz-Ul-Haque & Dr. Sita Ram Roy

39TH AISTA'S PATNA CONFERENCE : A NEW MILE STONE IN THE FIELD OF SCIENCE

Rabindra Prasad Sinha
Member EC, AISTA and Organising Secretary

On the bank of the holy river Ganga, The Pataligram of Buddha, Pataliputra of Kauatilya and Chandragupta Maurya, The Kusumpura of Aryabhat, Azimabad of medieval period, Patna Saheb of Guru Govind Singhji and today's Patna witnessed the mammoth assembly of enlightened science teachers from every corners of the country. It was the occasion of the 39th Annual Conference of the All India Science Teachers' Association (AISTA). Patna, the historic centre of science, knowledge, culture and trade got the opportunity to host the conference for the third time, first in 1965, second in 1979 and third time in the new millenium 2004.

It was also a great pleasure that on this occasion some of the organisers and stalwarts of 1965 and 1979 like eminent chemist **Prof. J.N. Chatterjea,** famous educationist **Prof. Ramji Prasad Singh, Prof. (Mrs.) Jayashree Bhattacharya, Sri Ram Naresh Jha, Sri R.L.P. Chaurasia** and others were also present while the present organizers were fortunate enough with the blessings and well wishes from their previous organizers like **Prof. (Dr.) A.S. Yadav,** Ex-V.C., Acharya Narendra Deo University, Faizabad (U.P.), **Prof. J.C. Bannerjee (P.U.) Prof. Nageshwar Prasad Sharma, Sri Parameshwar Prasad** of Lakshmi Pustakalaya, Patna, **Prof. Shailendra Kumar Shrivastava** (Bihar University) and **Prof. S.P. Verma** (P.U.) etc.

To hold the AISTA's 39th Annual conference successfully, an organising committee was formed on 4th October, 2004, under the chairpersonship of the Hon'ble V.C. of Patna University, **Dr. Jagannath Thakur.** He not only encouraged us but also gave good guidelines and extended his helpful hands but owing to unavoidable assignment he could not be available with us on the occasion. However, his blessings were always with us.

On 26th December, 2004, in the auditorium of Women's Training College, Patna University, Chemist of international fame **Prof. J.N. Chatterjea** inaugurated the conference by lighting the candle with full of enthusiasm. Prof. Chatterjea called upon the science teachers to take their profession as a great challenge and sow the seed of excellance in the field of science teaching from the very grass root level i.e. from the school level itself so that students may be perfect scientists in their life of colleges and universities. **Prof. Vinay Kumar Kanta,** Deptt. of Math, P.U., introduced the focal theme of the conference **"Scientific and Technological Awareness for All."** Prof. Kantha stressed that science teaching should be according to the pace of the modern world but with full of humane character and flexibility. **Sri Vijay Prakash,** IAS, Secretary, Primary and Adult Education, Govt. of Bihar as Chief-guest on the occasion appealed the science teachers to identify the specific quality of students and try to teach them in their particular specific conditions in a creative way. **Prof. Amitabh Ghosh,** Director, Bihar Council on Science and Technology and Indira Gandhi Planetorium, Patna, stressed that every citizen of the country should be aware of the development of science and technology. **Dr. Vijay Krishna,** Ex-D.G. Botanical Survey of India said that the fruits of science should reach the common masses. **Sri Basudeo Singh, Hon'ble teacher M.L.C.** greeted the delegates and appealed to the organizers to hold such types of seminars frequently and regularly. An eminent Physicist and **Vice Chancellor of L.N. Mithila University, Darbhanga, Bihar, Prof. (Dr.) Rajmani Prasad Sinha** expressed his view that science teaching should be always co-related with the practical work, for which laboratories should be well-equipped and good science journals should be made available regularly. Prominent educationist and one of the Patron of AISTA, Prof. **Ramji Prasad Singh** stressed that science teachers should have scientific temper, creative and innovative in their profession. **Mrs. Mridula Prakash,** Director, School of Creative Learning, Patna said that science teachers should always be research-oriented and should accept the teaching as a challenge at every step. **Prof. Daisy Naraian,** a famous social scientist of Women's College, P.U., is of opinion that science should make human beings free from superstition and dogmas. **Mrs. Raziya Hussain,** Vice-President of AISTA and delegate from Nagpur, Maharashtra thanked the organizers for holding the conference in the perspective of "the year of Scientific Awareness 2004." **Dr. M.M. Chel, General Secretary** of the AISTA presented the reoprt of the activities of the association. **Dr. S.N. Giri, President** of the AISTA presided over the inaugural session while **Organising Secretary Sri Rabindra Prasad Sinha** conducted the programme. **Prof. (Dr.) Saroj Bala Sinha, Principal,** Women's Training College, Patna and Senior Vice-President of the organising committee welcomed the guests and **Dr. (Mrs.) Chanchala Kumari, Principal,** P.N. Anglo School Patna proposed the vote of thanks.

The inaugural session started with the colourful welcome dance performed by the girls of BNR Training College, Patna-7 and Sangeet Mandir, Patna under the direction of Mrs. Sheela Kumari. The wall of conference hall was decorated by the traditional Madhubani Paintings with quoted poems on coloured clothes prepared by the **Bharat Gyan Vigyan Samiti, Bihar** while near the main banner, posters of "YSA 2004" were displayed by **Science for Society, Bihar.**

Hon'ble V.C. of Magadh University, Bodhgaya, **Prof. S. Hussain** and V.C. of B.N. Madal University, Madhepura, **Prof. (Dr.) K.P. Singh** also encouraged our every efforts. Whereas Hon'ble V.C. of L.N. Mithila University, Darbhanga **Prof. Rajmani Prasad Sinha** was present in the conference physically for two days and delivered **"Krishnan Memorial Lecture"** on 27th December, 2004. An attractive souvenir was released by **Prof. Raziya Tabassum,** Senior member of Bihar Public Service Commission (BPSC).

Sri Naveen Verma, IAS, Secretary, Secondary and Higher Education, Govt. of

Bihar, **Sri Aditya Narayan Singh,** Director, Secondary Education, Govt. of Bihar, **Sri M. Das,** RDDE, Patna, **Prof. Rohit Raman,** Adhyayan Evam Shodh Kendra, Patna, **Mr. Anupam Ji & Naren** of UNICEF, **Shri Braj Nandan Sharma,** President, Bihar Primary Teachers' Association conveyed their well wishes to the organizers and participants of the conference. On the occasion The Director, SCERT, Bihar, **Sri Ravindra Ram**, BES, **Sri Manoj Kumar,** BES, DEO, Siwan, **Sri Satish Kumar Singh** of S.K. Science Centre, Patna, **Mrs. Purbi Dutta Gupta, Prof. K.K. Dey, Prof. Asit Das,** Dean Students' Welfare Kalyani University (W. Bengal), **Smt. Lily Yadav** (Nagpur, Maharashtra), **Sri P.N. Mahton, Sri Satya Narayan Hota** (Orissa), **Sri Saryu Prasad Sinha,** Treasurer, BSTA, **Sri Vijay Kumar Singh,** Chief Editor, Prachya Prabha, eminent mediamen, journalists, publishers and personalities from different walks of life were present.

Thus, the 39th AISTA's conference started in a colourful, enthusiastic and very organised way on 26th December, 2004. The inaugural session paved the way for serious academic deliberations on various scientific issues and filled the sense of confidence in the minds and hearts of the organisers as well as delegates as to how a meaningful and nice national level conference and seminar can be organised and hosted with the kind assitance provided by the intellectuals, teachers and students community of Bihar.

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26, 27 & 28 DECEMBER, 2004

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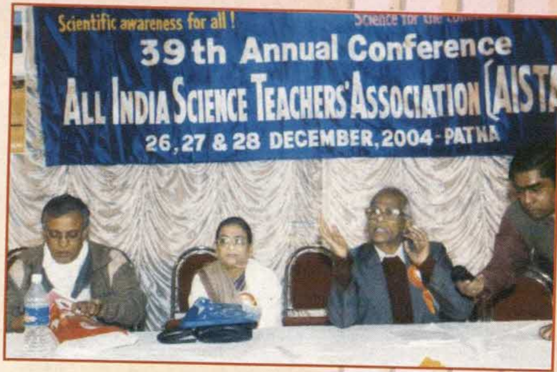
uvenir released by Prof. Raziya Tabassum, on her eft.,Mr. R. P. Sinha, Dr. S. N. Giri, Dr. M. M. Chel, Dr. Ashok Kumar, Mr. Mukhtar Singh Raziya Hussain and right Dr. S. N. Hota, Dr. Asit Das- and Dr. Amitabh Ghosh.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Hon'ble M. L. C. and popular mass leader Md. Yunus Lohiya addressing the valedictory session.

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A view of the Academic Session : Prof. J. C. George is presiding over the session, on her left Mrs. Raziya Hussain and right Dr. M. M. Chel

Dr. Naveen Kumar, Senior Scientist Bihar Pollution Control Board addressing academic session

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A View of the valedictory function.

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